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IDEA-0137-70

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2 July 1970

MEMORANDUM FOR: Deputy for Operations, OSA
THROUGH : Chief, SAS/O/OSA
SUBJECT : Program Progress Report

Attached is the Program Progress Report on Life-Support Activities for the period 1 April 1970 through 30 June 1970 from the Aero Medical Staff, OSA.

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Chief, Aeromedical Staff
Office of Special Activities

Attachment
As stated above

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LIFE SUPPORT ACTIVITIES

1 April 1970 thru 30 June 1970

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B. Life Support Equipment -

1. Ejection Systems - The R Model Ejection Seat ECP U-2R-45, two-seat ejection tests, through the canopy to qualify the headrest height adapters, were accomplished during this reporting period. Both tests were

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successful and a complete engineering report is expected from the Contractor within the next month.

2. New Equipment - Six (6) sage-green thirty-five foot camouflaged parachute canopies are being packed for operational mission requirements. Two (2) canopies will be available and packed at both Stations "G" and "H" and two (2) spares will be in storage at the prime contractor repack facility.

3. Developmental Efforts -

(a) R-Model Ventilation - During this quarter an engineering study of the article ventilation system was accomplished at Station "G". Initial impressions indicate that if the water separator is by-passed, adequate cooling is provided the pilot for ground operations. Headquarter's is awaiting the engineering summary from the contractor at this time. If this modification proves successful, installation of LOX coolers in the wheel well for ground operations will be unnecessary.

(b) Self-doffing lanyard - Consideration is being given to removal of the self-doffing lanyard of the S1010 PPA and storage of this item in a

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suit pocket. If and when it then becomes necessary for the pilot to evacuate his pressure suit attachment of the above lanyard could be accomplished. In the past this lanyard has been of concern when inserting the pilot in the aircraft and must be routed with extreme caution to preclude any undesirable attachments or hang-ups.

(c) Six-line Release - A mid-air modification of the RQ-225 parachute is being considered in order to provide the pilot with more control of the descending parachute. Test jumps have been performed and results were optimistic. Lockheed has been asked to consider this proposed change and to request the Air Force test center at El Centro evaluate the modification.

(d) S1010 PPA integrated Harness - A Service Bulletin has been requested from the David Clark Pressure-Suit Company for removal of the two (2) front harness pads and the installation of a chest strap on the S1010 PPA integrated harness. These minor modifications will enable the pilot to make a better Parachute Landing Fall (PLF) and allow him easier access to the risers for control of the parachute.

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4. Low-Pressure Chamber Transfer - The low-pressure chamber located at the ARO of Buffalo, N.Y., plant will be shipped to Davis Monthan Air Force Base during the month of June, 1970, for utilization by the Physiological Support Division (PSD) facility in training of the SAC aircrews in the S1010 PPA. Project pilots are trained at Station "G" by Personal Equipment personnel in the project low-pressure chambers and no further use of the ARO chamber will be necessary.

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LIFE SUPPORT ACTIVITIES

1 January thru 31 March 1970

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1. Ejection Systems

A. "R" Model Ejection Seat Modification:

In order to provide the project pilots with a walk-around sleeping bag and a tree-lowering device as part of the global concept in survival, a thicker seat pack is necessary. In some of the pilots, elevation of the pack will place the head of the individual above the canopy breaker bar. To resolve this situation adapters have been fabricated which will raise the canopy breaker either two or three inches as required. ECP-U-2R-45 will accomplish two-seat ejection tests through the canopy using a three-inch adapter. If these test firings are successful, new seat headrest height adapters will be installed.

B. "C" Model Ejection Seat Study:

A request has gone forward to LAC during this reporting period to present a cost estimate to cover the improvement of the U-2C egress system to make it comparable to that of the "R" Model. Of special interest is the improvement of low-altitude escape. LAC's reply on this matter reflects a cost of between to develop such a system.

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2. New Equipment

A. Life Rafts:

Eight (8) sage green one-man open-end life rafts have been ordered during this quarter. Four (4) will be placed in the operational mission kits at both "G" and "H". The standard one-man life raft that the Air Force has in its inventory, while not open-end, does provide for an excellent survival capability.

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It furnishes the inflatable hood and floor and all other features that our raft possesses except color. For these reasons all training flights use the Air Force rafts in the kits resulting in considerable saving since special order rafts run over

B. Nylon Spacers:

As a result of the unfortunate seizure of the neck-ring in the S1010 PPA during Scope Saint III, an engineering evaluation was conducted by the David Clark Pressure Suit Company with great expediency. It appears that the spring spacers inside the neck ring were the offenders and nylon spacers have been substituted with no compromise on torque values. All S1010 PPA neck rings have been modified in the project. SAC has been notified of the discrepancy and they, too, have changed to nylon spacers.

3. Developmental Efforts

A. Thermal Protective Garment:

In order to provide cold-water protection, an inflatable thermal garment has been fabricated, tested, and is now in use in S1010 PPA flights in which the possibility of cold-water immersion is imminent. Pilot acceptance seems good at this point and survival time has been extended considerably.

B. Gauge Adapter for Thermal Garment:

It is undesirable to penetrate the gas container any more than is absolutely necessary in a pressure suit -- "the chain is only as strong as its weakest link" -- concept. Therefore, an adapter has been designed to allow for one penetration of the suit on the sleeve with a dual purpose. One, the attachment of the pressure gauge and two, the availability of the oral inflation tube to the thermal garment. Only one adapter will be necessary for each pilot and cost of item will be less than \$100.00 each.

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C. Anti-Reflectance Visor Coating:

Two (2) S1010 PPA helmets currently have the clear visor coated with anti-reflectance material. One subject is evaluating this material at present and only a small improvement in anti-reflectance properties has been noted. Night flight has yet to be tested but the outlook is one of pessimism at this time.

D. ARO Cooling:

An ECP has been submitted by the ARO Corporation of Buffalo to allow for periodic cooling of the pilot by means of oxygen. This would be an emergency backup in the event the aircraft vent system failed. There are certain disadvantages to such a modification. Primarily, we are concerned with the possibility of allowing liquid oxygen to pass too far up the system from the converter resulting in damage to the breathing regulator. Tests will be performed during the next quarter to see if such a system does have merit.

E. Automatic Water-Activated Flotation:

At the present time activation of the flotation system within the S1010 PPA is manual. The SR-71 Program now uses an automatic activation system and the project would like to entertain such a concept if manual override is available. Blue Gull Operations, for example, would not want any automatic water activation device. This subject will also be exercised during the next quarter.

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5. S1010 PPA Parachute Evaluation

On 19 January 1970 a parachute jump was made at Station "G" by the HQ Senior Survival Superintendent utilizing the RQ 225 parachute mated to the S1010 PPA. The purpose of this jump was to evaluate the six (6) line release mid-air modification when performed while in the full pressure suit. A

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UH-1F Helicopter was used for airlift and exit was made from 5,500 feet above the terrain. A ten (10) second delay was employed after exit in order to try and reach terminal velocity. Opening force was above normal. Mid-air modification was performed without difficulty. However, when the arms were raised above the head to maneuver the chute, there was some degree of restriction in this movement due to pressure on top of the shoulders. No oscillation occurred during descent, however, in preparation for landing, it was found to be very difficult to get the feet and legs together for a safe parachute-landing fall (PLF). Landing was accomplished with legs apart in a relaxed position. Additional test jumps are planned during the next quarter with factory modifications to existing equipment in an attempt to resolve these discrepancies.

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